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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Densen Cao

Serial Number: 10/072,635

Filed: February 5, 2002

For: "Curing Light"

DOCKET: 5061.9 P



Examiner: Ralph A. Lewis

Group Art Unit: 3732

**Declaration of Commercial Success**

Commissioner for Patents  
P. O. Box 1450  
Alexandria, Virginia 22313-1450

Honorable Commissioner:

1. I am the inventor of the Curing Light that is the subject of the above-identified patent application.
2. I am the President and CEO of Cao Group, Inc., the owner of the above-identified patent application and the manufacturer of the Ultra-Lume LED 2 and Ultra-Lume LED 5 dental curing light which embodies the claimed invention.
3. Prior to my invention, the market leader in dental curing lights was Kerr/Demetron (division of Sybron Dental Specialties).
4. Prior to my invention, numerous other companies were already entrenched in the market for dental curing lights, including 3M, Espe, DMD, Welch-Allyn, American Dental Technologies, Luma-Lite, and Dentsply/Caulk.

5. The Cao Group manufactures product embodying the invention, and that product is distributed by Ultradent Products, Inc. of South Jordan, Utah ("Ultradent") under the name "Ultra-Lume LED 2".

6. Prior to distributing my invented dental curing light, Ultradent was not a player in the dental curing light market.

7. Since undertaking distribution of my invented dental curing light, Ultradent has gone from being a non-player in dental curing lights to becoming the market leader in dental curing lights sold in the United States, supplanting Kerr/Demetron.

8. Ultradent is currently selling my invented dental curing light at an annualized rate of about 8,000 dental curing lights per year, representing about \$8,000,000 in yearly retail sales volume. This represents a market share of approximately 7% of the dental curing light market in the United States.

9. Ultradent's market dominance in distributing my invented dental curing light cannot be attributed to low price since the Ultra-Lume LED 2 retails for \$999 while many other dental curing lights have a lower retail price in the range of \$500 to \$700.

10. Ultradent's market dominance in distributing my invented dental curing light cannot be attributed to Ultradent's prior dominance or reputation in dental curing lights since Ultradent was not a player in dental curing lights until Ultradent began distributing my product.

11. Both laboratory testing and reports from dentists in the field indicate that my invented dental curing light is more desirable than prior art dental curing lights for at least two important reasons:

- (i) Complete Cure. My invented dental curing light generates sufficient power (light

intensity) to cure most accepted dental composites completely. Many other dental curing lights, in particular recently-introduced LED dental curing lights, either do not achieve complete cure of the composite, or do not cure many of the popular composites used in dentistry.

(ii) Heat Management. My invented dental curing light uses an elongate heat sink that occupies at least 50% of the length of the dental curing light wand in order to draw heat away from the semiconductor light source. This heat management technique allows the semiconductor light source to operate cool and without danger of placing excessive heat inside of a patient's mouth, which is a distinct advantage over prior art halogen and plasma arc dental curing lights. This heat management technique also keeps dental curing light power (light intensity) high because it avoids causing a heat effect and consequent drop in light intensity that is common in LED dental curing lights when the semiconductor is overheated. Avoiding the heat effect and consequent drop in power assists my invented dental curing light in achieving a Complete Cure (above) where many competing products fail.

12. Success of my invented dental curing light in the market and Ultradent's rise from a non-player in dental curing lights to the market leader in the U.S. can be traced to superior performance of my invented dental curing light, and that superior performance can be traced to features that are the subject of the pending patent claims.

13. The pending claims read on the Ultra-Lume LED 2 and Ultra-Lume LED 5.

14. I believe that rise of the Ultra-Lume LED 2 and Ultra-Lume LED 5 to market leader in the United States based on its performance and features is clear evidence of commercial success of my invention.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States

Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted this 8<sup>th</sup> day of January, 2004.

Signature:     Cao    

Name:     Densen Cao



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## Ultra-Lume™ LED 2

Description & Indication

Photoinitiator Chart

Order



UltraLume LED 2 is a state-of-the-art curing light used for polymerization of dental materials. The curing unit produces high intensity light in the visible spectrum range of 410 to 490 nanometers. UltraLume LED 2 uses two, second generation Light Emitting Diodes (LEDs) to produce a high intensity 10x13mm oval footprint.

The unit has a hand-held wand and multi-voltage power supply connected by a cord. The wand

is designed to rest in a dental instrumentation console. It can be placed in a surface bracket provided with the kit. The power supply is adaptable for power outlets from 100 to 240 volts.

### 1660, UltraLume LED 2 Curing Light Kit

#### Contents:

- 1 - Dual LED curing handpiece
- 1 - Multi-voltage power supply wall plug
- 1 - Surface bracket with Tape
- 2 - ProxiCure 2 Lenses
- 2 - Transluminator lenses ( 1 orange, 1 violet)
- 5 - Regular clear lenses
- 10 - Plastic sleeve barriers with bands

#### Instructions:

UltraLume LED 2

UltraLume Surface Bracket

UltraLume Disposable Barrier Sleeves

**Ultr**  
**Equip**

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